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ABSTRACT

While researchers have studied the impact of technologies on primary, secondary, and higher education, this study asks, "What are the relationships between types of graduate education and the role of communication technology?" The purpose of this paper is to synthesize the current communication issues for distance education at the post-baccalaureate level in order to facilitate decision making by educators and policy makers on this evolving topic. It was found that subject matter is a determining factor in whether a course is offered at a distance and how it is supported by communication techniques. Most graduate-level programs available at a distance are professional rather than research-oriented. The critical components of post-baccalaureate education include: supervision of research, access to a library, and face-to-face interaction with faculty and peers. The most common media chosen to support these functions include: video and audio teleconferencing, computer-mediated communication, and text-based materials. Ultimately, the most pressing issues surrounding graduate distance education center around the role of dialogue versus transmission of knowledge. These communications issues are not unique to distance education. However, they appear to be moving to the forefront as technology forces an examination of pedagogical assumptions. (Contains 31 references.) (Author)

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Graduate Distance Education: A Review and Synthesis of the Research Literature

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Abstract

As we move further into the information age, the deeply entrenched nature of our industrial-age based education is becoming alarmingly outdated. Many are suggesting that the integration of new communication technologies into our schools is the key to reforming the existing educational system. While researchers have studied the impact of technologies on primary, secondary, and higher education, in this study we ask, "What are the relationships between types of graduate education and the role of communication technology?" The purpose of this paper is to synthesize the current communication issues for distance education at the post-baccalaureate level in order to facilitate decision making by educators and policy makers on this constantly evolving topic. We found that subject matter is a determining factor in whether a course is offered at a distance and how it is supported by communication technologies. Most graduate-level programs available at a distance are professional rather than research oriented. The critical components of post-baccalaureate education include: supervision of research, access to library, and face-to-face interaction with faculty and peers. The most common media chosen to support these functions include: video and audio teleconferencing, computer-mediated communication, and text-based materials. Ultimately, the most pressing issues surrounding graduate distance education center around the role of dialogue versus transmission of knowledge. These communication issues are not unique to distance education, however they appear to be moving to the forefront as technology forces us to examine our pedagogical assumptions.

Graduate Distance Education: A Review and Synthesis of the Research Literature

Distance education in 1994 is one of the words that is most often associated with a blitzkrieg of new communication technologies and allusions to the National Information Infrastructure and the Information Super Highway. Lewis Perelman, among the most controversial writers on the subject, notes that what the incredible advances in communication technology have produced is a revolution "which puts learning and education on a collision course" (1992, p. 23). The essence of this radical shift according Perelman and others is a shift from the concept of "just in case" learning to a "just in time" conceptualization of learning. The argument goes that mass public education at all levels, has taught skills and content "just in case" a student might find the information useful at some time in the future. With the velocity of knowledge accumulating at staggering speeds, what can be known "just in case" becomes an impossible decision for students and the society which they inhabit and shape. Instead, the demands of modern society are such that learning needs to be done "just in time" to be useful to the problem at hand. This requires new ways of understanding the relationships between space and time as they relate to the teaching and learning process. The spatial relationships between learners and other learners and learners and content is likewise the subject of significant alteration.

In post World War II United States, most states built schools so that all citizens would have equitable access to an institution of higher education. This usually took the form of building colleges, universities, junior colleges and technical colleges through each region of the state so that students could easily attend a college in their own "backyard." With every shift in population or breakthrough in knowledge, the state responded with new schools, new majors, more courses, new approaches, new graduate programs at institutions without resources able to support research-oriented graduate study. Very little was cast aside. Great Britain, on the other hand, developed the British Open University, which sought to extend the world of the university to marginalized groups through distance education.

While this description hardly captures all the nuances of 50 years of higher education and graduate study, it does mean to suggest that the technological possibilities of the modern era are located within a context of

educational establishments that were conceived of and built with many similar concerns as those faced in the late 20th century. The desire to provide equity and access to higher education resulted in what is often referred in the US as an "over built" educational system. These same issues of equity and access that were used to create the Open University are again at the center of controversies surrounding technology in education and distance education in particular.

The traditional graduate student profile is changing. Across all fields of graduate study, today's student population can be described as older and includes more women and ethnic minorities (Brazziel, 1993). The number of college degrees awarded to women has shown steady growth since the 1980s. While women currently earn more master's degrees than men, female doctoral production is estimated to increase 36% from 1990 to 2000 as compared to a 3% decline in males (Cirasa-Parish, 1993). Women also are earning a growing share of professional degrees such as medicine and law (Crispell, 1994). The total number of students ages 35 and above is predicted to increase 26% from 1988 to 2000 (Cirasa-Parish, 1993).

Businesses and labor leaders are recognizing the importance of re-training American workers so that their skills meet twenty-first century employment needs. As the U.S. continues to downsize military forces, the government will be looking for opportunities to re-train those individuals and support their migration to civilian life. From an individual perspective, adults are going back to school to: 1) pursue mainstream studies leading to their first degree; 2) acquire additional qualifications in order to change occupations or advance their careers; and 3) seek personal fulfillment. (Adults in Higher Education, 1987).

The primary purpose of this paper is to synthesize the current important communication issues for distance education at the post-baccalaureate level in order to facilitate decision making by educators and policy makers on this constantly evolving topic. Toward this end, we : 1) describe current technologies and distance education practices operating in the US and internationally; and 2) address strategic concerns for the researcher and administrator. The research question that has guided our review and analysis of the distance education literature is: "What are the relationships between types of graduate education and the role of communication technology in the graduate education process?"

Technological Concerns and Possibilities

Generally researchers and practitioners in distance education share many pedagogical and philosophical concerns with others in education. Nevertheless, technology is one area of concern which receives much greater emphasis among distance educators than among most of their colleagues. Technological concerns involve a relatively distinct set of philosophical and practical issues.

Convergence of computing, telephony and television is changing the nature of distance education. What began as text-based correspondence study depending largely on the printing press and the postal system, has evolved into live-satellite broadcasts to hundreds of people, simultaneous-interactive teleconferencing among multiple sites, and global-computer networking among millions of pc's. While technologies have expanded educational opportunities for many, concerns surrounding the implementation and influence of technology transfer have expanded as well.

Technological Possibilities

A combination of communication technology is available for storage, distribution, and retrieval of information and relationships. While many teaching institutions continue to rely on text-based study materials for the bulk of their distance education, telecommunication technologies are playing a larger role in the educational process. Micro-chips are revolutionizing storage capabilities; fiber-optic networks can distribute vast amounts of data instantly, and laptop computers are available to retrieve information virtually anywhere in the world (McCain & Maxwell, 1994).

One way to classify the technologies available for distance education is based on the level of interaction supported and the base mode of delivery--audio, video, and computer. We have argued elsewhere that the terms transmissional and diologic characterize the tension between pedagogical, technical and philosophical issues of distance education (Richter, Maxwell, & McCain, 1994). *Transmissional* below refers to technologies supporting a one-way non-interactive model of communication such as watching television as opposed to two-way, *Dialogical* communication supported by a telephone.

	Transmisisonal	Dialogical
Audio	radio, audio tapes	telephone, audio teleconference voice mail
Video	broadcast tv (cable or satellite) video tapes, ITFS, slow scan/freeze frame (one-way)	point-to-point microwave interactive tv (cable or satellite) electronic blackboard
Computer	databases (on-line journals and abstracts), reference tools	Computer aided instruction Computer-mediated communication (CMC) (e-mail, bulletin boards, computer conferencing)

Advantages and disadvantages exist for both transmissional and dialogic technologies. The latter have the advantage of being available in most households, and therefore familiar and non-threatening to use. Learning can be done at convenient times alone or in groups either at home, the workplace, or study center. However, the disadvantages for transmissional technologies include no peer-group interaction, not being able to ask the instructor questions during the lesson, and the effort required to study at home or office (often filled with distractions).

Dialogic facilitating technologies allow learners and teachers to interact during a lesson--asking questions, making comments, explaining complicated concepts, etc... Disadvantages of these technologies involve the use of more complicated technology, courses that are more time and place bound, and additional costs. Dialogic technologies can be either synchronous or assynchronous. Synchronous interaction refers to that which takes place in the same time frame such as telephones, and assynchronous refers to that which takes place in different time frames (at the users' convenience) such as voice and electronic mail.

Dialogic Possibilities

This dichotomy between dialogic and transmissional educational tools can simplify the organization of technologies, but begs the questions of application in any meaningful way. Dialogue and monologue are things that people do; they are human communicative activities. Labeling communication technologies along an "interaction continua" helps to see the interdependence between what is technically possible and useful (Borsook, 1991). The transmission vs. dialogue dichotomy is seen from a technical point of view regarding the possibility for communicative variety, but this in no way should be confused with human use. There is a continuum from virtually no two-way interaction (television), to complete interactivity (face to face), yet we know people who talk to their televisions, but not to their children. Borsook identifies seven key factors that influence a dialogic learning environment, claiming that all instructional technologies possess a degree of interactivity to the extent that they have more or less of each of these factors. The factors include: 1) immediacy of response; 2) non-sequential access of information; 3) adaptability; 4) feedback; 5) options; 6) bi-directional communication; and 7) interruptability. These factors of interactivity highlight the fact that face to face contact is not a sole determining factor of whether or not interaction or dialogue is taking place. For instance, while video tapes are considered by many to be monologic, according to Borsook's view, they can provide a degree of immediacy of response, non-sequential access, and interruptability. A further application of these factors reveals that the traditional lecture-based course taught at universities around the world may be much less interactive than some technologically supported distance-education classes.

Decisions as to which technologies should support a distance-education course should be based on learner characteristics including: number of learners, their distribution, support arrangements, level of learning, and subject matter. The level of dialogue within the teaching and learning process is not determined exclusively by which technologies are used, but is dependent on the individuals involved and their desire to participate in and actively encourage dialogue. For example, providing electronic mail and computer access for all instructors and students does not mean dialogue will take place. Communication technology's role is to support the necessary links between teachers, students, and learning materials. Communication technology needs to be viewed as a tool potentially useful for all those involved.

Higher Education's Role

Traditionally, graduate students have been focused on campus oriented activities-- research, coursework, and teaching, since residential students have been the norm. The non-traditional students of the information age have complicated demands including family and job responsibilities that make graduate study designed for residential students problematic. A balance of school work with other demands is a necessity. Contemporary colleges and universities have seldom adapted their entry requirements, curricula, schedules, and modes of delivery or support services to the needs of this new clientele. In order to pursue higher education, these non-traditional students need things such as: open admissions (or at least credit for work or life experiences); flexible class times; and access to instructors and research facilities. The "new adult learner" requires programs that are appropriate for their levels of skills and knowledge, their constraints of time and place, as well as their goals for self-directed learning (Avery, Friedemann, & Stoller, 1992).

Higher-education institutions are facing competition for this clientele (Perelman, 1994). Demand for training and professional development will continue to increase, and industry may begin to meet the need (Kirby & Garrison, 1989). Additional competition is coming from organizations dedicated solely to distance education. Such institutions as Mind Extension University (ME/U) and the National Technological University (NTU) select courses that are taught at universities and colleges all over the country and technologically bring them to students at flexible times and places. Partnering with industry and government agencies to develop programs that will not only meet the needs of students, but also those of the future employers is an increasingly important priority for higher education.

Graduate-Distance Education Exemplars

While the majority of higher-distance education is at the undergraduate level, programs at the graduate level have been increasing (Northcott, 1987; Paulsen, 1992; Wells, 1992, Acker & McCain, 1993). Many educators are concerned about the likelihood of maintaining first-rate graduate studies at a distance (Kirby & Garrison, 1989; Northcott, 1987). The most commonly named characteristics that distinguish post-baccalaureate studies include: 1) Close supervision of research projects; 2) access to library and other learning resources; 3) and seminars or similar face to face interaction with faculty and peers (Kirby & Garrison, 1989; Northcott, 1987). Some institutions have creatively designed programs that simulate class discussion and provide

library access through technology, and incorporate short-term (week at a time) residential schools for intensive seminar work. The following section takes a look at these critical elements of graduate studies and how distance-education programs are addressing them.

Project Supervision

The element of independent research and contribution to a particular field of study has long been a part of graduate education. Research projects at the post-baccalaureate level should represent continued original work carried out by the student over time. The need for faculty to supervise and guide project or dissertation work is important to ensure the work is feasible and stays on course (Northcott, 1987). Students need individual help from an advisor with specialized knowledge of the particular topic, and they also need to be able to discuss problems, roadblocks, and questions in real time.

Because of the particular challenges related to a research-based program, many schools offering distance programs are pursuing post-baccalaureate studies in professional or vocational areas that can be entirely coursework based. For example, faculty at the Open University in Great Britain describe themselves as knowledge distributors not knowledge creators (ERASMUS, 1991).

Nova University in Ft. Lauderdale, Florida, offers doctoral degrees from a distance that have been designed for practitioners rather than researchers (Northcott, 1987). Their approach involves study-group clusters of 30 students with a local coordinator. Study modules are specially prepared by lecturers of national standing in their fields. Each lecturer visits each cluster once a month for an intensive Saturday session. Nova staff evaluate student projects. Students are required to attend an eight-day summer institute each year (residential school), and in place of the dissertation, students undertake a research project requiring them to apply the relevant theoretical ideas and research findings to an actual problem and provide a solution.

Other programs are debating if master's degrees should require actual research or merely show awareness of the nature of research (Northcott, 1987). Dividing the supportive role into an internal and external supervisor is being experimented with as well. The internal supervisor is the traditional

faculty member in the academic department, and the external supervisor is someone who works with the student at their place of employment. Obviously this arrangement would not work for all graduate students, but it is quite beneficial for those with full-time jobs and pursuing a professional degree or certification within the same field.

Technology can support the communication links between the student and the advisor. Recent research claims that computer-mediated communication such as electronic mail and computer conferencing provides students with more individualized attention than face to face instruction. Allowing teachers to communicate assynchronously with their students in the privacy of their offices at convenient times is thought to contribute to the quality of mediated interaction. Instructors can read messages from their students and thoughtfully take their uninterrupted time to respond. Students are not limited to meeting with their advisor only during office hours (often during normal work hours) and can ask questions and receive feedback from their advisor at their convenience as well. The telephone is another tool that can support the synchronous (real-time) discussions frequently required by students and advisors.

Access to Research/Library Resources

A study of post-graduate distance-education students found that their biggest problems were associated with lack of library access--literature searches, record searches, texts, journal articles, and bibliographic databases (Northcott, 1987). Specialist literature in scientific, mathematical, and technical fields is generally tougher to get than arts, social sciences, and educational materials. Additionally, these students in science and engineering programs also require access to labs and specialized equipment.

Different programs and courses are dealing with this challenge in various ways. Some provide self-contained courses that involve sending all necessary resources in the form of a study guide to students (Mitcham, 1989). At Nova University, these guides are prepared by their national lecturers (Northcott, 1987). For many programs, the learning material includes common textbooks, packets of designated reading prepared by the instructor, and learning guides that include a module of instruction for each course objective (Holmberg, 1989; Mitcham, 1989; Wells, 1992). While this may seem to solve the problem for some, it also deprives the students of exercising their own criticism and judgment by limiting their choice of literature. One approach is

to provide students with the general texts and materials relevant to the area of study and requiring them to apply the concepts and theories to their particular work (Holmberg, 1989). This method will be more appropriate for particular subjects (such as business, education, and nursing) and can work hand-in-hand with the use of an external supervisor.

Connecting students to electronic tools such as online databases, journals, and texts, is possible through computer-mediated communication, however this is very expensive and as yet not readily available. Nova University provides their students with an information retrieval service that includes computer access to ERIC and other relevant databases, computer printout facilities, and the entire ERIC microfiche collection (Northcott, 1987). Schools that have established study centers (such as Great Britain's Open University and Nova) provide limited library resources at those sites.

Seminars

Seen as the cornerstone of postgraduate work, the seminar provides the framework for dialogue between lecturers and students and among the students themselves (Northcott, 1987). Through this interaction, students are socialized into their academic discipline. Without this interaction, group learning activities are inhibited, and students may be unable to assess their performance and progress (Wells, 1992). Distance-education institutions are taking a variety of avenues to facilitate this interaction through residential schools, study centers, and technologically through audio, video, and computer conferencing.

Residential schools can be a valuable time for students to discuss their coursework, projects, and dissertations with individual faculty members. The schools can provide an opportunity for "hands on" experience for science and technology students and for the development of skills in areas such as computing, interviewing, interpersonal relations, group decision making, case studies, and experimental exercises (Northcott, 1987). These schools also can be a good time to bring in national lecturers or researchers for specialized seminars. Usually residential schools meet once a year for one to two weeks during the summer.

Many of the distance-education classes found in the literature at the post-baccalaureate level consisted of two or more sites connected via audio or video teleconferencing (Bland, Morrison, & Ross, 1992; Dillon, Haynes, & Price, 1990; Egan, 1991; Gee, 1990; Leclair & Boss, 1990; Acker & McCain, 1993; Mitcham,

1989; Smith & McNelis, 1993). In these cases, a primary instructor led the class and provided the learning materials with a facilitator or site coordinator at each of the other sites. These facilitators were most helpful when they stayed in close touch with the "lead" instructor, led learning activities and discussions, clarified assignments, and provided timely feedback (Egan, 1991). A host of scholars has found that learning groups plays a significant role in interactive-mediated learning (Bland, Morrison, & Ross, 1992; Dillon, Haynes, & Price, 1990; Egan, 1991; Leclair & Boss, 1990). These groups simulated the seminar forum by providing support for the learning activities that were a part of each course and giving distance learners a sense of confidence in the ability to be successful as graduate students. These groups contributed to motivating the learners to complete the courses and continue with their chosen programs. Challenges for the instructor of an interactive-television class also were highlighted in these studies. Making eye contact with the distance learners, appearing at ease in front of the camera, appropriate pacing of lecture and discussion, and smooth camera operation all contribute to a successful and effective class (Bland, Morrison, & Ross, 1992; Egan, 1991).

Conducting class online through computer-mediated communication is another way to facilitate the group interaction of the seminar format (Davie & Wells, 1992; Gunawardena & Boverie, 1993; McIsaac, 1993; Paulsen, 1992; Olejnik & Wang, 1993; Regan & Tuchman, 1990; Scigliano, Joslyn & Levin, 1988; Smith & McNelis, 1993; and Wells, 1992). Evidence suggests that mediated discussion can be more effective than the face to face counterpart as the former requires more preparation on the part of all participants (Davie & Wells, 1992; Northcott, 1987; Paulsen, 1992; Wells, 1992). To ensure quality interaction, the instructor plays a critical role as a facilitator--posing questions not supplying answers and knowing when to stay silent so others will be encouraged to speak (Bland, Morrison, & Ross, 1992; Gee, 1990; Wells, 1992). Responsive faculty providing fast turnaround times on assignments and questions contributes to a sense of belongingness for the distance learners (Holmberg, 1989). Students will be more likely to participate in discussion if it is for a specific purpose such as a group project. Specific features of the online classroom can empower students by enabling them to take a visible and meaningful role in the interaction, to analyze large quantities of information, and to belong to a supportive group of individuals working together (Davie & Wells, 1992; McIsaac, 1993).

Trends in Current Graduate Distance Education

Several interesting trends have surfaced throughout this literature review centering around course content, mode of delivery, and access to faculty, fellow students, and learning materials.

Course content seems to be a determining factor of whether a course was offered at a distance. The majority of programs in the case studies reviewed were professional or vocational rather than research-based and centered around a prescribed body of knowledge for the students to digest. Subjects included: business (Jones, 1991; Kirby & Garrison, 1989; Regan & Tuchman, 1990; Wells, 1992); professional medical (Kirby & Garrison, 1989; Leclair & Boss, 1990; and Mitcham, 1989); education (Bland, Morrison, & Ross, 1992; Egan, 1991; Gee, 1990; Gunawardena & Boverie, 1993; Kirby & Garrison, 1989; Wells, 1992); and engineering and computer science (Kirby & Garrison, 1989; Scigliano, Joslyn, & Levin, 1988; Wells, 1992). These programs could be categorized as being coursework based and seemed to share the mission stated by the Open University, that is, to distribute or transmit and not create knowledge (ERASMUS, 1991). This trend indicates a clear distinction between preparing practitioners and preparing researchers.

Three particular modes of delivery were evident in the literature. Each mode has particular technological and facility requirements and supports the access requirements of the graduate-education process in different ways. The first mode focuses on independent study supported by study centers, study guides, and residential schools. This mode is characterized by freedom from time and space constraints, however the potential for isolation due to lack of regular interaction with instructors and faculty can be a problem. Study centers and guides combined with residential schools are used to provide access to faculty, peers, and learning materials. The second mode is assynchronous computer-mediated communication. These online classrooms also offer flexibility with regards to time and space and can simulate the group interaction desired by most graduate programs. This mode requires that all students have access to computers and extra effort on the part of the instructor to initiate interaction in this new environment. Access to faculty and peers is provided electronically, while learning resources may be provided through the mail, at local libraries or bookstores, or electronically. The third mode is synchronous-interactive teleconferencing between established locations with site coordinators and groups of students at various locations. This mode

provides the closest thing to seminar forums enabling students to regularly meet with group members, however this also introduces time and space requirements. Often times the distant sites are satellite campus locations, so library access is rarely a concern, nevertheless, study guides provide most of the needed learning material. Interaction with the instructor is mediated, and site coordinators play a major role in guiding students.

Access to faculty, peers, and library resources received varying emphasis in the literature. Supervisory support was emphasized in the position papers (Kirby & Garrison, 1989; Northcott, 1987), however, it was rarely ever mentioned as a concern in the case studies. The role of the instructor in the case studies centered around providing structured lectures, study guides, and timely feedback. Interaction with fellow students and teachers was always emphasized and was supported through study groups, residential schools, computer-mediated communication, and audio and video teleconferencing. Interaction with advisor for the specific purpose of individual project or research efforts was rarely mentioned in the case studies. Library access also was not mentioned in the case studies. Instead, the emphasis on study guides seemed to eliminate the need for outside library resources.

International Comparisons

Current Concerns

Internationally as in the U.S., a growing number of students seeking continuing education or graduate school are female, older, employed, and attend school part-time. Situations vary across regions and economic conditions, but a common trend evident throughout the literature involves the need to train and re-train the workforce. Most countries fear they will be facing shortages of a highly qualified and skilled labor force as a result of a number of factors, one of which being their poor adaptation to a constantly changing industrial and technological environment (Commission of the European Communities, 1992; Unesco, 1987). Many countries believe their development determines their labor productivity growth and hence the overall growth of their economy. As skill requirements rise, continuing education and training seem to be the only way to stay competitive. While general training of the workforce is a high priority for most countries, a more specific concern involves individuals in rural areas not able to access education and those who have essentially failed out of the national education

systems. For these, literacy and preserving national culture are important objectives along with basic skills training.

Proposed Solutions

Many countries are looking to distance education to solve their education and training challenges. Compared to the U.S. and Canada, higher distance education, throughout the rest of the world, is linked more closely with industry and government sponsorship. Almost all higher distance education institutions are government funded as an apparent link exists between higher distance education and labor/workforce planning. Governments are expanding learning opportunities for students based on a belief in human capital theory, that is, a belief in the correlation between national prosperity and an educated population (Unesco, 1987). One advantage of government sponsorship is the breadth of programs they make possible. Where higher distance education is provided by many dual mode institutions, providing both traditional and distance education, the main criticism is an excessive choice of arts/social science courses and a lack of science/technology courses.

Distance-education programs are predominantly text based combined with small amounts of audio cassettes. With a few exceptions, such as China, the use of broadcast television is declining. The integration of advanced communication technologies such as two-way interactive teleconferencing and computer-mediated communication that are the basis for many American programs is certainly the exception rather than the rule internationally. Distance education institutions that are controlled by government and are designed to enroll tremendous numbers of students rarely offer a means for dialogue between teacher and students. These institutions (found in such countries as China and India) more closely resemble the transmission of knowledge model. As enrollments in these schools increases, so does the cost effectiveness. Proponents of this model believe that the independent study habits developed throughout these programs is a skill valued by employers and a virtue in societies looking to break their tradition of rote learning (Unesco, 1987). An interesting benefit of the text-based programs is their ability to strengthen national cultural and linguistic development. As major producers of print materials, these institutions have a special role in maintaining and enhancing local languages. Examples are Korea, Thailand, French Canada, Holland, and Israel (Unesco, 1987). Most European programs include some type of a face to face element whether it is a network of study centers located

throughout a region or country or a residential component required of every student (i.e., one week each summer).

Some institutions focus on full-fledged degree programs while others focus on short-cycle programs aimed at certification or qualifications for a particular occupation (Unesco, 1987). Most higher distance education is not based on principles of open learning--not offering the open admissions policy made known by the Open University. Instead, admissions policies are quite similar to conventional institutions as the biggest systems are there to expand the number of university places for 18 to 24 year old students not able to get into national-traditional systems due to lack of access. Entrance into these schools often is based on competitive exams. For example, in China, selection for higher distance education is closely linked with the workplace (those already working have a much better chance of getting admitted), and in South Korea, admission is by lottery among higher school graduates (Unesco, 1987).

The Unesco study Higher Level Distance Education (1987), reported that most of the international distance education literature comes from countries with only one-fourth of the total number of higher distance education students. In the middle 1980's, with an estimated total of 4 million higher distance education students worldwide, 3 million of them were concentrated in the countries of China, South Korea, Thailand and the old Soviet block. Most literature on the topic, however, is produced in Europe, Australia, Canada, and the U.S. Generalizations about higher distance education in the international arena should be interpreted with caution as it may only apply to a minority of students.

Overall, the international perspective in distance education at the graduate level seems to be encouraging collaboration and cooperation across government, industry, and higher education (traditional and distance-based) in an effort to accomplish such goals as: 1) raising the overall level of technological literacy; 2) encouraging the pursuit of scientific and technical careers; 3) developing more flexible courses and modes of delivery (such as exploring new technologies); 4) developing an educational system to improve qualifications of the workforce; 5) promoting language skills; 6) establishing a better scheme for continuing education in industries; and 7) reaching more sections of society with distance education. (Commission of the European Communities, 1992; ERASMUS, 1991; Unesco, 1987).

Conclusions

Although the specific definition of distance education continues to be debated as scholars attempt to establish the discipline and prescribe its practices, educators across the world are facing challenges ranging from philosophical issues to practices. The philosophical implications center around the role of dialogue versus transmission of knowledge in the educational process and the interplay of autonomy and control between student and teacher (Richter, Maxwell & McCain, 1994). These critical communication issues are not unique to distance education but must be dealt with on a fundamental level within education as it relates to the markets, technology and policies of communication technologies.

What is the relationship between types of graduate education and the role of communication technology in the graduate education process? In the U.S., we found that the subject matter is a determining factor in whether a course is offered at a distance and how it is supported by communication technologies. Professional or vocational programs characterized by an established body of knowledge and a prescribed set of skills (such as nursing, engineering, computer science) are more likely to be offered through distance modes. Programs not found to be prime distance-education candidates are those which are predominantly research-based (such as doctorates in the humanities and sciences).

The critical components of post-baccalaureate education include: 1) close supervision of research projects; 2) access to library and other resources; and 3) face to face interaction with faculty and peers. Most commonly, a combination of media are used to support the teaching and learning process including: 1) video and audio teleconferencing; 2) computer-mediated communication; and 3) text-based materials (paper and electronic copies).

Many of the trends in the U.S. are shared throughout the industrialized nations. Countries share concerns of global competition, economic shifts, and the technological and social changes brought on by the information age. Distance education has long been available in many countries as access to traditional higher education has been more limited (than in the U.S.) and government and industry have become increasingly concerned with labor productivity and economic growth.

As the 21st century approaches, the presence of communication technologies in the graduate education process will continue to expand.

Exploring the implications of technologically-mediated teaching and learning and examining our assumptions about transmissional and dialogic pedagogy can enlighten our efforts to provide graduate students the highest quality education.

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